Citation:

Dauchet L, Amouyel P, Dallongeville J. Fruit and vegetable consumption and risk of stroke: A meta-analysis of cohort studies. *Neurology.* 2005 Oct 25; 65(8): 1,193-1,197.

PubMed ID: 16247045

Study Design:

Meta-analysis or Systematic Review

Class:

M - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To assess the relationship between fruit, vegetable and fruit, and vegetable consumption and the risk of stroke.

Inclusion Criteria:

- Published prospective studies that assessed the relationship between stroke and consumption of fruit and vegetables, separately or combined
- Fruit and vegetable intake was assessed with validated methods
- Inclusion criteria for events were all cerebrovascular events, including ischemic, thrombotic, embolic, hemorrhagic and transient ischemic attack
- Inclusion criteria for exposure variable was fruit and vegetable consumption per se and not one of their respective nutrients (i.e., only food groups named as follows in the articles: All vegetables, total vegetables, all fruit, total fruit or fruit).

Exclusion Criteria:

Outcomes that combined cerebrovascular and cardiac events.

Description of Study Protocol:

Recruitment (Search Sstrategy)

- Searches were conducted in MEDLINE and EMBASE from 1970 to September 2004
- References from the extracted articles, reviews, and previous meta-analyses were also used
- Terms (MeSH terms and truncated free text) included cardiovascular disease, cerebrovascular disease, cerebrovascular disorders, stroke, cohort studies, prospective studies, follow-up studies, fruit and vegetables.

Design

Meta-analysis.

Statistical Analysis

- The relative risk (RR) of stroke for an increment in one standard portion per day of fruit and vegetables and related confidence intervals adjusted for the greatest number of potentially confounding variables was extracted form the original report
- The RR for ischemic stroke was used if the results for more than one event were available
- The portion size was 106g. When the RR was expressed in frequency, the exposure level was calculated from the mean value of intake in the validation study
- Heterogeneity among studies was assessed using the Cochran's Q test
- The pooled estimate of the RR was computed assuming a log linear model.

Data Collection Summary:

Dependent Variables

All cerebrovascular events, including ischemic, thrombotic, embolic, hemorrhagic and transient ischemic attack.

Independent Variables

Fruit and vegetable consumption (i.e., food groups named as follows in the articles, including all vegetables, total vegetables, all fruit, total fruit or fruit).

Control Variables

Study results that controlled for the greatest number of potential confounders were used.

Description of Actual Data Sample:

- *Initial N:* 11 studies (four studies and part of a fifth did not meet inclusion criteria)
- *Attrition (final N): S*even independent studies comprising 232,049 subjects (90,513 men and 141,536 women), 2,955 events and an average of 10.7 years of follow-up
- *Age:* 25 to 103 years
- *Location:* Studies conducted in US, Japan and Europe.

Summary of Results:

Key Findings

- The pooled RR (95% CI) of stroke for each increment of one portion of fruit per day was 0.89 (0.85 to 0.93)
- The pooled RR (95% CI) of stroke for each additional portion of vegetable per day was 0.97 (0.92 to 1.02) (NS)
- The pooled RR (95% CI) of stroke for each increment of one portion per day of fruit and vegetable was 0.95 (0.92 to 0.97)
- There was a linear relationship between fruit intake and stroke, but not between vegetable intake and stroke

- There was no evidence of heterogeneity among studies and no evidence of a publication bias.

Author Conclusion:

The meta-analysis shows a linear association between consumption of fruit and decreased occurrence of stroke, but no significant reduction in stroke rates with vegetable consumption.

Reviewer Comments:

- *Study strengths:*
  - *Results adjusted for potential confounders were used*
  - *Only studies that used dietary assessments that were validated were used*
  - *Tests for heterogeneity among studies and publication bias were used*
- *Study limitations:*
  - *The analysis is based on observational studies, which may include residual confounding and measurement error*
  - *There were many differences among the studies including dietary assessment methods, the variety of fruit and vegetable investigated, the selection of the reference group and the choice of exposure categories*
  - *The characteristics of events were not always comparable among studies.*

Research Design and Implementation Criteria Checklist: Review Articles

Relevance Questions		
1.	Will the answer if true, have a direct bearing on the health of patients?	Yes
2.	Is the outcome or topic something that patients/clients/population groups would care about?	Yes
3.	Is the problem addressed in the review one that is relevant to nutrition or dietetics practice?	Yes
4.	Will the information, if true, require a change in practice?	Yes

Validity Questions		
1.	Was the question for the review clearly focused and appropriate?	Yes
2.	Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search termsused described?	Yes
3.	Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased?	Yes
4.	Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible?	No
5.	Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined?	Yes

6.	Was the outcome of interest clearly indicated? Were other potential harms and benefits considered?	Yes
7.	Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issued considered? If data from studies were aggregated for meta-analysis, was the procedure described?	Yes
8.	Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included?	Yes
9.	Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?	Yes
10.	Was bias due to the review's funding or sponsorship unlikely?	Yes